824 pack baskets as in gathering acorns. At camp when
222 sufficient quantity of cones gathered, men, women prepared bed of sage (uyuga·dul), Artemisia tridentata Nutt. or A. cana Pursh., cones dumped on
824 this, brush fired. Cones tested from time to time
222 to determine whether heat from burning brush had caused scales to open sufficiently; if by time
251 brush burned down cones not sufficiently open, more brush was piled on top of them, roasting continued. After cones fully opened, allowed to cool; nuts shaken, picked out by hand from charred cones or winnowed from dirt and spread out on hides laid on ground around camp to dry for 3-4 days, as for acorns. Cached in pits. Those piñons which fell to ground from cones which had opened on trees as season advanced gathered by hand, brought home unroasted. Roasted piñons often pierced with sharpened twig of mt. lilac (utugu·bï·l), Ceanothus cuneatus, foothill floral area, and strung on long lengths of native twine; lengths of strung piñons festooned over houses when owners returned to village, or made into baskets (p. 32) at piñon grounds. Later these strung piñons eaten as delicacies.

222 During May, green cones of Digger pine twisted
462 from branches, chiefly by men, boys; sliced down
252 sides with obsidian knife; nuts picked out of soft shells, eaten immediately. Later in fall when cones matured but scales still closed, cones gathered by men, boys, roasted and treated in same manner as piñon cones.

222 Small seeds such as chia, wild oats, Mentzelia seeds, juniper berries, gooseberries, manzanita, and boxthorn berries gathered with seed beaters as Steward describes (Steward, 1933, 239). Bunch grass and Polypogon gathered on stem, dried in sun; seeds of wild heliotrope taken out by hand,
[262 eaten raw on spot. Elderberries broken off on
264] stalk, stalk shaken over basket into which berries fell. Tule, rush roots, mariposa lily bulbs dug in moist ground with digging stick; woman knelt on both knees, dug to one side or other of her body. Sunflowers treated as Steward describes (Steward, 1933, 239). Center stalk of Spanish bayonet and mescal knocked down at base with stave before stalks budded; prickly buds of Opuntia speared with sharply pointed stick; buds of tree yucca knocked off limb with staves. Leaves, stalks, small plants cut with obsidian knife.

●412 Digging stick (u·lu·ini·l) straight stick, 4-5 ft. long, unweighted; made from piece of dry oak sharpened to point on end by rubbing on rock. Straight long stick (ma·wišul), 10 ft. or longer, used for knocking piñons off trees; shepherd's crook staff (olodi·l) had handle 3 1/2 ft. long with 5-in. crook at end. Crook made by bending end of green stick over knee and tying it in bent position with bark rope; stick then left to dry in hot sun for 3 days before crooked end untied.

Preparation of plant foods and beverages.- Mortar and pestle or grinding slab and rub stone

252 Mortar and pestle or grinding slab and rub stone used in preparing different types plant food.
412 Mortars (pahal) included pit mortars, which were depressions 2-10 in. deep, 3-5 in. wide in level or gently sloping granite outcrops (Kroeber, [773] Handbook, 524, pl. 45). Manufacture of pit mortars attributed to Coyote, but fact recognized that mortar holes enlarged with use until at depth of 10 in. they became unusable.

412 Portable stone mortars (ku·pahal) from 6-35 in.
322 in total diameter; made by pecking out depression
324 in round soft gray stone with harder, pointed rock (SM). Small stone mortars readily transportable; taken on piñon expeditions. Large wooden portable mortars (ku·pahal) of Yokuts type (Kroeber, Handbook, 524, pl. 45) made from hard wood, oak (SM), juniper (FP); bowl burnt out and interior smoothed with rough rock. These latter "easier to make than stone mortars" and commonly used around home, but were too large to take on trips. Basketry hopper used. Pestles (poho'owal) for all types mortars were roughly cylindrical, granite or slate rocks, picked up in river beds, used as found; length of pestles varied from 5-20 in., width from 2 1/2-5 in., depending on size of mortar.

412 Grinding slab (mana·l) oval or roughly rec-
324 tangular piece of granite or black slate, from 14-20 in. long, 10-15 in. wide, and 2-4 in. thick; used on one side only; grinding surface flat or slightly concave. Suitable slabs fairly abundant in area, and woman always kept one such in house, leaning up against wall. With slab, either small ovoid rub stone (takibit) 3-4 in. long, about 3 1/2 in. wide, 2 in. thick, flat on top and bottom surfaces (Gifford and Schenck, 92, pl. 31), or larger stone of same shape (takin) used; these picked up in river beds. Long cylindrical mullers not used. When in use, grinding slab set up with flat rock, about 2 in. thick, placed under upper end of slab, so that slab slanted downward, away from operator. Lower end of slab rested on flat basketry tray.

412 All informants familiar with 3-legged metate
177 and horned muller (Steward, 1933, 341, pl. 5g),
252 because one such introduced among them by former Jesus Miranda, Mexican who married Petra Miranda, Tübatulabal woman; this metate used primarily for grinding corn (FP). However, present-day Tübatulabal ordinarily pound parched corn or wheat into meal in pit mortars, following older pattern.

252 Cooking techniques included stone boiling, boiling in clay pots, parching with live coals on basketry tray, parching in fire, roasting on coals, in ashes, in pit ovens, on spits, in fire. General pattern of native cookery, which resulted in economy of effort, was to apply heat only once to any variety of food intended to be eaten in cooked state. Thus small seeds which had already been parched, and previously roasted piñons, after they were ground into meal, were merely mixed with cold water when made up into gruel (u'u·gil); neither seed nor piñon meal recooked by stone boiling (or any other method), parched foods being

291 These 2 pieces were then seamed together from
281 front of sole as far up as ankle and also seamed to each side of back piece. In front, from ankle upward 2 side pieces were tied together with 2 sets of buckskin thongs; sometimes upper set of thongs was wrapped around leg and tied either in
[314] front or back. To make soles wear longer, melted pitch from Digger pine smeared over outside of
[412] soles (FP). Deerbone awl used to punch holes for seams, which were stitched with sinew. Moccasins made by men; worn by men, women in summer, "not in rainy weather" (SM), when hunting, wood gathering, piñon gathering, etc.; children also wore them if "going some place," but footgear was not worn habitually or on short trips.

Sandals (same name as moccasins) were made of heavy buckskin sole to which a straight strip of buckskin 3 in. wide, 8 in. long was sewed in back (fig. 4; Mus. cat. no. 1-28227, 15-10538). When worn, this buckskin flap was brought upward

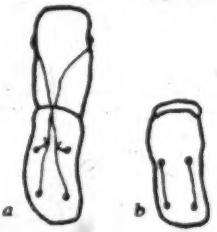

Fig. 4. Sandal. a, front view, showing strap arrangement; b, under side of sole, with strap.

to lie flat against back part of lower leg. Flap secured against leg by long buckskin thong, middle part of which held flap against lower leg. Ends of thong were brought forward on either side of leg, crossed in front over instep and threaded downward through 2 slits on each side of sole at instep; ends were then run up on under surface of sole to 2 holes underneath great and 4th toes and threaded up through these 2 holes. One end of thong passed between great and first toe, other between 3d and 4th toe; ends tied to upper sections of thong just below point where these were crossed over instep. Such sandals were used only when roasting piñons, to protect feet "when there was a hot fire to walk around" (SM). Fiber sandals never made, used.

292 Snowshoes not used, there being "not much snow
132 in the valley" where majority of semipermanent winter settlements were situated.

302 Coiffure.- Men wore hair long, loose (SM); sometimes parted it in middle and tied it in back (FP); never braided it. Women wore hair long, loose, parted, banged in front (Gayton, 1929, pl. 97a, b);
[372] banging done by holding front hair out from forehead in bunch, burning ends off with glowing stick of Atriplex canescens (James (cĭw'wĭ·ĭbĭ·l). Woman's back hair sometimes braided, tied (FP wore hair thus; aboriginal?). When pounding acorns, otherwise employed in hot

411 bow was 68 in., width at grip 1 3/4 in., at tips
3/4-in. SM denied that Tübatulabal formerly ever
[176] bowed in grip; FC very probably had introduced
this feature.

Boys used small plain willow bows and willow
[462] arrows "before they began regular hunting" (SM).
Bows, arrows made by men only.

Arrows.- War arrows (pa·hal) were 34-36 in. long, with wooden foreshaft (wawpit), some 8 in. long, made from hard wood set into cane mainshaft made from stalks of cane (paha·bï·l), same variety as that from which women obtained sweets (p. 19). Mainshafts also sometimes made from wood. Cane mainshaft (u·gat) straightened by being gently rolled at joints in round groove and over shallow incisions of heated stone arrow straightener (u·giit). Mainshaft notched at upper end for insertion of bowstring; foreshaft split at end for insertion of arrowhead. War arrows had 3 vanes, square-trimmed, 1 in. wide, set on spirally and attached at each end with sinew; "if only 2 feathers were put on, the arrow didn't shoot straight, it went sideways" (SM). FC's arrows nevertheless had 2 vanes, set on spirally. Feathers from eagles, crows, owls,
[324] 3 varieties of hawks among those used. Arrowheads (kïyi·l) were flaked from obsidian (tu·gu··pïl tïnt, black rock), obtained near Mt. Whitney (SM); from bluish gray rock procured in mts. (SM), at Koso (FP); from a red rock (flint?) obtained near Tejon or on Mohave desert. Stone "cooked" first in fire, then broken into small
● [412] pieces (FP). Deer-bone awl used to flake arrowheads; palm of left hand protected with piece of buckskin. Heads varishaped (fig. 7), "because some men liked this kind, some that" (ES), but all heads shouldered. Beautifully shaped head (fig. 7), 3 1/4 in. long, 1 in. wide at top, found by FC on old battlefield on Nichols peak, in s. border of Tübatulabal area; SM said this
[317] probably head for war arrow, as heads for such often 6 in. long(!). Asphalt (tu·šanat) used to set heads into foreshaft; no mention made of sinew lashings. Poison (pohil), source of which was unknown to informants, said to have been used on both war, hunting arrowheads (MM); only on hunting arrowheads (SM).

Hunting arrows (šu·mu·na·l), for use on large game, similar to war arrows save that they were 48 in. long, with 9-in. wooden foreshaft and were often tipped with smaller, black obsidian heads which were inserted rather loosely into foreshaft so that shaft fell out after animal was shot, leaving head firmly embedded; or if shaft did not fall out, it could be pulled out easily, head then cut out with stone knife.

Arrows of foregoing type used with sinew-backed bow; with willow bow cane arrows (šu·mu··na·l), 40 in. long, 2-3-vaned, tipped with wooden foreshaft, point of which had been sharpened by rubbing on rough rock, used to shoot rabbits, etc. For birds, shorter cane arrows with pointed

415 which was used later to pack back deer; if going to war, man carried quiver slung over left shoulder and tied under right arm with twine.

411 Arrow rel[illegible]an shot either standing or kneeling; i[illegible]g, weight rested on left knee, which [illegible] ground; squatting position (Kroeber, Handbook, 822, pl. 78) never assumed for shooting (SM). When standing man held bow perpendicularly; if kneeling, horizontally; primary release used in both positions (SM).

Spear.- Although SM denied spears used in warfare, MM, FP both said they were, the spear (ku·yi·l, FP) being a 4-ft. shaft of any sort of hard wood, tipped on end with an obsidian head some 10-12 in. long (MM). This head was "sharp on both edges" (FP); what may have served as spear heads are shown in outline (fig. 7f-h), although SM when shown the red flint originals, from the collection of Miss Shirley Andress, said they were unfinished arrowheads.

TOOLS

412 Knife.- Knives (pigat) used for skinning large
324 game, etc., flaked from obsidian or red quartz;
[171] 18 in. (?) long, unhafted, similar in shape to Owens Valley Paiute knife (Steward, 1933, 261, fig. 3i). General utility knife (same term), used for cutting buckskin, shaping bow, etc., consisted of flaked obsidian blade about 5 in. long, set in wooden handle; similar to Owens
[171 Valley Paiute knife (Steward, 1933, 261, fig. 3j),
317] except that Tübatulabal set blade in handle with asphalt, did not lash it with sinew. Hafted knives aboriginal (SM).

Adz, wedge, maul.- Informants could give no information on adz, wedge, or maul; presumably these lacking. SM did not know whether trees ever felled, and if so, how; stone axe apparently lacking. Holes in wooden mortars made by burning out wood; stone mortars chipped out; "the gray stone was soft" (SM).

412 Scraper.- Entire lower leg bone of deer used as scraper (iši·bišt) to dehair skins.

Awl.- In sewing moccasins, sacks, quivers, etc., and in flaking arrowheads, knife blades,
[171] an awl (niŋa'adol) similar to Miwok awl (Kroeber, Handbook, 806, fig. 67h) used; this awl about
[317] 4 in. long, made from leg bone of deer topped with lump of asphalt; when used, strip of buck-
[462] skin (ma·pu·ništ) wound around palm of right hand; this awl essentially man's tool.
Women used smaller awl (wiŋabït), shaped like man's awl, but made from spine of barrel cactus (kïče'apïl) surmounted with small lump of asphalt, when making coiled baskets.

283 it was wrapped around left wrist. Made by men, women; used extensively for nets, fish lines, bridles, forehead band on pack strap, loops on pack basket, on water bottles, as warp for rabbitskin blankets, bowstring for rabbit bows, foundation for eagle dance skirts, to tie babies on cradles, tie newborn child's umbilical cord, as thread to sew up sacks, etc.

Rope (tu·mayu·t) made from outer bark of Fremontia californica Torrey (u·pul); long branches, trunk of shrub peeled, fresh bark softened between hands and 3 strands braided into rope which was used to lash bundles of tules together for raft, to tie up crook on piñon staves, to bundle firewood into load, for 2 ends of pack strap, etc.

LEATHERWORK

281 Tanning.- Tanning done chiefly by men, although women sometimes dehaired skins. Green hides (tu·šu·but) hung up to dry, doubled over line with skin side out, for 6-8 days. If not to be tanned immediately they were folded up, stored in house. When tanned, hide soaked in cold water 3 days (SM); MM said soaked for week, being taken out at intervals and as much hair as possible pulled out with fingers. After thorough soaking, hair and fat, if any, scraped off with deer-bone scraper as among Surprise Valley Paiute (Kelly, 118). Hide put in warm water to which deer brains had been added, and soaked overnight. Next morning hide dried, then returned to brain solution, soaked again for 24 hours. Hide then rinsed out in clear water, looped around post and wrung out using short stick as lever (Kelly, pl. 21a, b). Lever, with hide still tightly twisted into coil around it, stuck between pole on which hide was looped and another pole 1 ft. away and hide left thus, tightly twisted, for about 30 minutes; after this hide slipped off lever, flattened out, stretched, rolled, and rubbed between hands. After fibers thus partly softened, hide draped over horizontal bar set into forks of 2 upright posts 3 ft. high, 3 ft. apart; hide pulled back and forth over bar, man often working with hide thus at intermittent intervals for 2-3 days. Tanned hides (takta·šat) not smoked; sometimes whitened; negative 15-6273 shows Tübatulabal man softening clay-whitened deerskin.

[412 171] [401]

Skins to be tanned with hair on, as wildcat skins used for wrapping up infants, were scraped clean on skin side, skin wet, and deer brains, which had been soaked in small amount water, rubbed into hide with hands. Hide then allowed to dry and pulled, rubbed between hands until soft. Bear hides also tanned with hair left on, brains being worked in with scraper.

237 Fresh deer brains could be used for tanning hide, but usually dried brains used, prepared as follows. Deer skull cracked open with rock, brains scooped out, smeared over both sides cir-

249 N. bigelovii plant, height 35 in., leaves 4-6 in. long, 1 1/2-2 1/2 in. wide; Z, untended N. attenuata plant, 22 in. high, leaves 2-3 in. long, 1-2 in. broad.

249 Plate 4. a, Estefana Salazar gathering tobacco leaves. b, Frances Philips stripping midribs from tobacco leaves. c, Legora Tungate, Frances Philips, Estefana Salazar with tobacco wrapped in willow bundles ready to be cured.

249 Plate 5. a, cured tobacco drying in sun. b,
412 brush-shaded pit mortar, showing pestles, fiber
415 brush, and basketry tray used when pounding cured
276 tobacco. c, balls and plugs of tobacco drying in sun.

343 Plate 6. a, sweat-house pit with remains of
301 sweat house at village site no. 4 (fig. 11).
342 Circumference of pit 37 ft., depth 6 ft. b,
133 necklaces of cylindrical shell beads and colored-
773 glass trade beads. c, ruins of transitional house type of tules and cottonwood at village site no. 7, Onyx rancheria, South Fork valley. d, pa·ša·pan, at base of mts. 3 mi. SW of Onyx and 1/2 mi. E of Kelso creek; showing boulder which Coyote, according to legend, broke in 3 pieces when Bluejay attempted to build bridge across Kelso creek to Nichols peak.

[p. 84 (b)]

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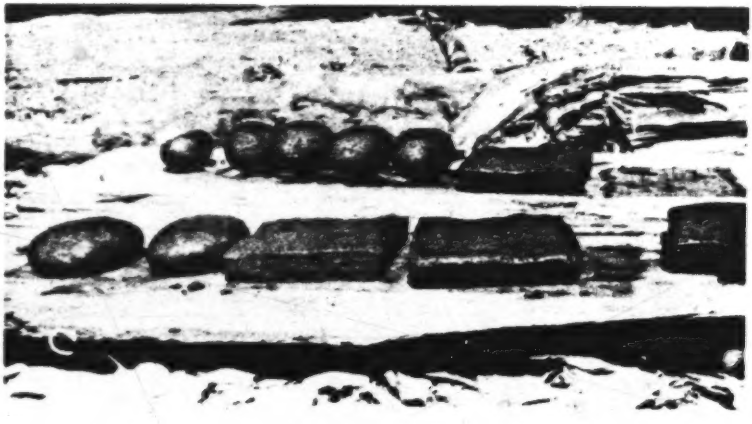

[p. 89]